US005676697A

United States Patent [19]

McDonald

[11] Patent Number: 5,676,697

[45] Date of Patent: Oct. 14, 1997

[54] **TWO-PIECE, BIFURCATED INTRALUMINAL GRAFT FOR REPAIR OF ANEURYSM**

[75] Inventor: **Edward A. McDonald**, Irvine, Calif.

[73] Assignee: **Cardiovascular Dynamics, Inc.**, Irvine, Calif.

[21] Appl. No.: **681,906**

[22] Filed: **Jul. 29, 1996**

[51] **Int. Cl.**[6] **A61F 2/06**

[52] **U.S. Cl.** **623/1**

[58] **Field of Search** 623/1, 11, 12; 606/194, 195

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,657,744	4/1972	Ersek	3/1
3,826,257	7/1974	Buselmaier .	
4,577,631	3/1986	Kreamer .	
4,994,071	2/1991	MacGregor	606/194
5,100,429	3/1992	Sinofsky	606/195
5,306,286	4/1994	Stack	623/1
5,306,294	4/1994	Winston et al.	623/1
5,360,443	11/1994	Barone et al.	623/1
5,366,473	11/1994	Winston et al.	606/198
5,405,379	4/1995	Lane	623/1
5,441,515	8/1995	Khosravi et al.	606/194
5,489,295	2/1996	Piplani et al.	623/1
5,540,713	7/1996	Schnepp-Pesch	623/1
5,562,724	10/1996	Vorwerk	606/195
5,562,726	10/1996	Chuter	606/195

OTHER PUBLICATIONS

MinTec "Stentor" product brochure, undated, one page.

World Medical Manufacturing Corp. "Bifurcated Nitinol spring/graft" product brochure, Dec., 1995, two pages.

Corvita Corp. "Corvita Bifurcated Graft" produc brochure, undated, one page.

J. C. Parodi, M.D., et al., "Transfemoral Intraluminal Graft Implantation for Abdominal Aortic Aneurysms", *Annals of Vascular Surgery*, vol. 5, No. 6, 1991, pp. 491–499.

J. C. Parodi M.D. et al., "Endoluminal Aortic Aneurysm Repair Using a Balloon–Expandable Stent–Graft Device: A Progress Report", *Annals of Thoacic Surgery*, vol. 8, No. 6, 1994, pp. 523–529.

J. May, MS et al., "Treatment of complex abdominal aortic aneurysms by a combination of endoluminal and extraluminal aortofemoral grafts", *Journal of Vascular Surgery*, vol. 19, No. 5, 1994, pp. 924–933.

T. A. M. Chuter, M.D. et al., "Bifurcated stent–grafts for endovascular repair of abdominal aortic aneurysm", *Surgical Endoscopy*, vol. 8, 1994, pp. 800–802.

Primary Examiner—Michael J. Milano

Attorney, Agent, or Firm—Knobbe, Martens, Olson & Bear, LLP

[57] **ABSTRACT**

An intraluminal graft and method and apparatus for installing an intraluminal graft in relation to a bifurcation of a trunk vessel into two branch vessels to bypass an aneurysm defect or injury, wherein the intraluminal graft is formed of two cooperating graft prostheses. The first graft prosthesis is formed of a flexible tubular member having leg openings and a side, waist opening defined by self-expanding, collapsible stents that may be collapsed under restraint and positioned to bridge the bifurcation and allowed to expand to resemble trousers with the waist opening facing the lumen of trunk vessel and the legs fitting within the branch vessels and defining a first graft lumen therebetween. The second graft prosthesis is formed of a tubular member of sheet material that may be collapsed under restraint and advanced through the first graft lumen and then allowed to self-expand to be seated in the waist opening and against the trunk vessel wall.

28 Claims, 11 Drawing Sheets